1. OVERVIEW

Subject Area	Biology
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	First
ECTS	6 ECTS
Type	Core
Language(s)	Spanish
Delivery Mode	On-campus and blended
Semester	Semester 1
Coordinating professor	Emilio Blanco Castro

2. INTRODUCTION

In order to provide a comprehensive education to future professionals in the field of Human Nutrition and Dietetics, this subject area of general Biology has been designed to study the biological foundations of living things and of the cell, i.e. the core unit of life.
The subject area of Biology is part of Module 1: The Basic Science of Biology, and will chiefly focus on the study of basic concepts of biology and cellular biology, later going into detail on the structure, organisation and functions of eukaryotic cells.
Through the study of the cell cycle, students will learn the mechanisms involved in the proper division of cells, thereby allowing for the correct balance and functionality of the cell, the tissue and the body (homeostasis).

Finally, we will assess some of the effects of abnormalities in the normal activity of eukaryotic cells that result in the development of medical conditions and imbalances such as cancer.
The subject area is divided into 5 learning units, which are then further divided into topics as described in section 4: Contents.

3. SKILLS AND LEARNING OUTCOMES

Key skills (CB, by the acronym in Spanish):

- CB1: Students have shown their knowledge and understanding of a study area that builds on general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB2: Students can apply their knowledge to their work professionally and possess the necessary skills, usually demonstrated by forming and defending opinions, as well as resolving problems within their study area.

- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.
- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT1: Communication: ability to engage in active listening, ask questions and respond in a clear and concise way, as well as to effectively express ideas and concepts. This includes concise and clear written communication. CT2: Leadership: ability to offer ideas, approaches and interpretations through strategies which offer solutions to real-life problems.
- CT4: Adaptability: ability to detect, interpret and respond to a changing environment. Ability to equip themselves and work effectively in different situations and/or with different groups or individuals. This means adapting to change depending on circumstances or needs. It involves the confidence to take on crucial challenges on a personal or group level, maintaining good physical and mental health to allow effective work to be carried out.
- CT9: Ability to put knowledge into practice, using the skills acquired in the classroom to mock situations based on real life experiences that occur in the relevant profession.

Specific skills (CE, by the acronym in Spanish):

- CE8: Know about the normal structure and function of eukaryotic cells. Relationships between cells and their environment.
- CE9: Know and understand the mechanisms of cell division, the cell cycle and control mechanisms, how cell differentiation takes place and the role of stem cells. CE35: Be familiar with the sociocultural approach to food and its and function.
- CE10: Know about the fundamental abnormalities in the normal structure and function of cells.
- CE11: Master the basic techniques of lab work.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Know the biological foundations of human beings.
- RA2: Know the general principles of biology.
- RA3: Become familiar with the principles of genetics.
- RA4: CE8: Recognise the structure and function of eukaryotic cells.
- RA5: Know and understand the molecular and cellular basis of disease.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CB2, CB3, CB4, CT1, CT4, CE8	RA1: Know the biological foundations of human beings.
CB1, CB2, CB3, CB4, CT1, CT9, CE8	RA2: Know the general principles of biology.
CB1, CB2, CB3, CB4, CT1, CT4, CT9, CE10, CE11	RA3: Become familiar with the principles of genetics.
CB1, CB2, CB3, CB4, CT1, CT4, CT9, CE8, CE9, CE11	RA4: CE8: Recognise the structure and function of eukaryotic cells.
CB1, CB2, CB3, CB4, CT1, CT4, CT9, CE10	RA5: Know and understand the molecular and cellular basis of disease.

4. CONTENTS

Learning Unit 1. Introduction to Biology.

- Tema1: What is biology?
- Topic 2. The study of cells: cellular biology
- Topic 3. Prokaryotic cells, eukaryotic cells and viruses

Learning Unit 2. Biology and the laboratory.

- Topic 4. Model organisms in biology
- Topic 5. The biology lab
- Topic 6. Techniques of cellular biology

Learning Unit 3. Eukaryotic cells.

- Topic 7. Cell membrane
- Topic 8. The cytoskeleton and cell movement
- Topic 9. Cytoplasmic organelles
- Topic 10. The nucleus

Learning Unit 4. Cell division and homeostasis.

- Topic 11. The cell cycle and control mechanisms
- Topic 12. Mitosis and meiosis
- Topic 13. Cellular aging and cell death

Learning Unit 5. Stem cells and the maintenance of adult tissue: cellular differentiation. Abnormalities.

- Topic 14. Stem cells and their general characteristics
- Topic 15. Introduction to embryonic development and cellular differentiation
- Topic 16. Cellular reprogramming

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Problem-based learning
- Collaborative learning
- Simulated environments
- Learning based on workshops/labs

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Lecture	50
Independent working	37
Problem-solving	13
Debates and discussions	4
Workshops and/or lab work	18
Public spoken defence of work	7
Tutorials	14
Knowledge test	7
TOTAL	**150**

Blended learning

Learning activity	Number of hours
Reading of content	13
Online seminars	7
Independent working	45
Problem-solving	17
Debates and discussions	23
Workshops and/or lab work	18
Online tutorials	20
Knowledge test	7
TOTAL	**150**

7. ASSESSMENT

The assessment methods, together with their respective weighting towards the final grade for the subject, are as follows:

On campus:

Assessment method	Weighting
Knowledge test	60
Learning portfolio	10
Performance observation	10
Laboratory work	20

Blended:

Assessment method	Weighting
Knowledge test	60
Learning portfolio	10
Performance observation	10
Laboratory work	20

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities, including the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference work for following this subject area is:

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra*. 8ª ed. México: Pearson Educación.
- Calvo, A (2015). *Biologia Celular Biomédica*. Ed. Elsevier.
- Canga, C. (2021) *Manual de Biología*. Ed. Ibersaf. Madrid.

The recommended bibliography for more specialised reading with regard to each learning unit is as follows:

Learning Unit 1.

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra* (8ª ed. México: Pearson Educación

Learning Unit 2.

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra* (8ª ed.. México: Pearson Educación
- Cooper G. M., Hausman R. E. (2014). Capítulo 1. Visión global de la célula e investigación celular. *La célula* (6ª ed. p. 15-20). Madrid: Marbán
- Paniagua Gómez-Alvarez R. (1999). 1. Métodos de estudio de la célula y de los tejidos. *Biología celular* (p. 5-19). Madrid: McGraw-Hill Interamericana, D.L.
- Skloot R. (2011). *La vida inmortal de Henrietta Lacks.* Madrid: Temas de hoy.

Learning Unit 3.

- Audesirk T., Audesirk G, Byers B. E. (2008). 5. Estructura y función de la membrana celular. *Biología: la vida en la Tierra* (8ª ed. p. 80-99). México: Pearson Educación
- Cooper G. M., Hausman R. E. (2014). Capítulo 1. Visión global de la célula e investigación celular. *La célula* (6ª ed. p. 15-20). Madrid: Marbán
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- Gartner L. P., Hiatt J. L., Strum J. M. (2007). Capítulo 1: Membrana plasmática. *Temas claves biología celular e histología* (5ª ed.). Philadelphia: Lippincott Williams & Wilkins.
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Learning Unit 4.

- Audesirk T., Audesirk G, Byers B. E. (2008). 11. La continuidad de la vida: Reproducción celular. *Biología: la vida en la Tierra* (8ª ed. p. 190-219). México: Pearson Educación
- Jiménez L. F., Merchant H. (2003). Capítulo 19: El ciclo celular. *Biología celular y molecular* (p.595- 616). México: Pearson Educación.
- Gartner L. P., Hiatt J. L., Strum J. M. (2007). Capítulo 2: Núcleo. *Temas claves biología celular e histología.* Philadelphia: Lippincott Williams & Wilkins.
- Cooper G. M., Hausman R. E. (2014). Capítulo 14. Ciclo celular. *La célula* (6ª ed. p. 591-608). Madrid: Marbán.
- Paniagua Gómez-Alvarez R. (1999). 8. Ciclo celular de la célula. *Biología celular* (p. 345-357). Madrid: McGraw-Hill Interamericana, D.L.

Learning Unit 5.

- Chandar N., Viselli S. (2010). 1-Células troncales y su diferenciación. *Lippincott's Illustrated Reviews: Biología molecular y celular* (1ª ed.). Philadelphia: Lippincott Williams & Wilkins.
- Cooper G. M., Hausman R. E. (2014). Capítulo 14. Ciclo celular. *La célula* (6ª ed. p. 621-625). Madrid: Marbán.
- Sell. S. (2013). Introduction to stem cell. *Stem cell handbook* (2ª ed. p. 1-28). New York: Humana Press.
- Wobus A. M., Boheler K. R. (2006). *Stem cells.* Berlin, Heidelberg: Springer.
- Baynes, John W. (2011). *Bioquímica médica* 3a. ed. Madrid: Elsevier, D.L. 2011.
- Mukherjee S. (2011). *El emperador de todos los males: una biografía del cáncer*. Editorial: DEBATE